

What is claimed is:

1. A method for use in the production of a face plate of a display, the method comprising:

5 providing a substrate assembly of the face plate of the display, the substrate assembly including a conductive surface at a first side of the assembly;

providing one or more projections extending from the first side of the substrate assembly; and

10 electrophoretically depositing a patternable material on the conductive surface and adjacent the projections.

2. The method of claim 1, wherein the one or more projections include a plurality of spacers extending from the first side of the substrate assembly.

15 3. The method of claim 1, wherein the method further includes patterning the patternable material resulting in a first patterned layer defining openings to the conductive surface for use in deposition of one or more light emitting elements on the conductive surface.

20 4. The method of claim 3, wherein the method further includes:  
forming one or more first color light emitting elements on the conductive surface through the defined openings in the first patterned layer;  
removing the first patterned layer after the one or more first color light emitting elements are formed resulting in exposed regions of the conductive surface;

25 repeatedly electrophoretically depositing and patterning of patternable material and forming of light emitting elements on the conductive surface to form one or more additional light emitting elements of one or more additional colors on the conductive surface.

5. The method of claim 3, wherein the patternable material is an electrophoretic photoresist.

5 6. The method of claim 1, wherein electrophoretically depositing the patternable material over the conductive surface and adjacent the projections includes electrophoretically depositing a patternable material mixed with a light emitting material over the conductive surface and adjacent the projections.

10 7. The method of claim 1, wherein the method further includes patterning the patternable material by tackifying one or more surface regions of the deposited patternable material.

8. The method of claim 1, wherein the light emitting elements are phosphors.

15 9. The method of claim 1, wherein the one or more projections are nonconductive projections.

20 10. The method of claim 1, wherein the one or more projections include at least portions that are slightly conductive, the slightly conductive portions of the one or more projections further having patternable material electrophoretically deposited thereon.

25 11. A method for use in the production of a display, the method comprising the steps of:  
providing a substrate assembly including a conductive surface;  
providing one or more nonconductive regions formed on the conductive surface, wherein the one or more nonconductive regions have a thickness less than about 15 microns; and

forming a layer of patternable material by electrophoresis over the conductive surface and the one or more nonconductive regions.

12. The method of claim 11, wherein the method further comprises providing one or more projections extending from the substrate assembly beyond the nonconductive regions formed on the conductive surface.

13. The method of claim 11, wherein the one or more nonconductive regions include one or more nonconductive light emitting elements.

14. The method of claim 13, wherein the one or more nonconductive regions include one or more phosphor light emitting elements.

15. The method of claim 11, wherein the one or more nonconductive regions include a nonconductive light absorptive black matrix.

16. The method of claim 11, wherein the method further includes patterning the patternable material resulting in a patterned layer defining openings to the conductive surface for use in formation of light emitting elements on the conductive surface.

17. The method of claim 11, wherein forming the layer of patternable material includes electrophoretically depositing a patternable material mixed with a light emitting material on the conductive surface and the nonconductive regions for use in formation of light emitting elements on the conductive surface.

18. The method of claim 11, wherein the method further includes patterning the layer of patternable material by tackifying one or more surface regions of the layer

of patternable material for use in formation of light emitting elements on the conductive surface.

5 19. A method for use in producing a display having a face plate and a base plate, the face plate having one or more spacers extending from one side thereof for spacing the face plate from the base plate in the display, the method comprising:

electrophoretically depositing a patternable material over a conductive surface of the face plate in regions adjacent one or more of the spacers;

10 patterning the patternable material resulting in a patterned layer defining openings to the conductive surface;

forming a material on the conductive surface through the defined openings;  
and

removing the patterned layer.

15 20. The method of claim 19, wherein the one or more spacers are nonconductive spacers.

20 21. The method of claim 19, wherein at least portions of the one or more spacers are slightly conductive, and further wherein the electrophoretically depositing a patternable material includes depositing patternable material over the slightly conductive portions of the one or more spacers.

25 22. The method of claim 19, wherein forming the material on the conductive surface includes forming one or more conductive light emitting elements on the conductive surface through the defined openings.

23. The method of claim 19, wherein forming the material on the conductive surface includes forming one or more nonconductive light emitting elements on the conductive surface through the defined openings.

5 24. The method of claim 23, wherein patterning the patternable material includes photostabilizing the patterned layer such that the patterned layer is generally insoluble to organic solvents.

10 25. The method of claim 24, wherein forming the one or more nonconductive elements includes electrophoretically depositing phosphor or phosphor containing material on the conductive surface through the defined openings.

15 26. A method for use in the production of a color display to deposit a pattern of light emitting elements capable of emitting light of at least two different colors when excited, the display including a face plate having a plurality of spacers extending from one side thereof for use in spacing the face plate from a base plate of the color display, the method comprising:

20 providing a face plate substrate assembly from which the plurality of spacers extend, a conductive surface of the substrate assembly is exposed in regions between the plurality of spacers; and

using an electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface.

25 27. The method of claim 26, wherein the plurality of spacers are nonconductive spacers.

28. The method of claim 26, wherein at least portions of the plurality of spacers are slightly conductive, and further wherein using electrophoretically deposited

patternable material includes depositing patternable material over said slightly conductive portions of the spacers such that electrophoretically deposited light emitting material used to form the pattern of light emitting elements on the conductive surface is not formed on the slightly conductive portions.

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29. The method of claim 26, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

electrophoretically depositing and patterning the patternable material to define openings therein to the conductive surface;

photostabilizing the patterned layer such that the patterned layer is generally insoluble to organic solvents; and

forming one or more phosphor elements on the conductive surface by electrophoresis through the defined openings.

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30. The method of claim 26, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

electrophoretically depositing and patterning a first layer of patternable material resulting in a first patterned layer defining first openings to the conductive surface for use in the formation of one or more first color light emitting elements on the conductive surface;

forming the one or more first color light emitting elements on the conductive surface through the first openings;

removing the first patterned layer; and

repeating the electrophoretically depositing, patterning, forming and removing steps to form one or more additional light emitting elements of one or more additional colors on the conductive surface.

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31. The method of claim 26, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

electrophoretically depositing a first patternable layer of a mixture of a patternable material and a first color light emitting material over the conductive surface and adjacent the spacers;

patterning the first patternable layer to form regions of the first patternable layer corresponding to one or more light emitting elements of a first color;

removing the patternable material from the regions of the first patternable layer to form the one or more light emitting elements of the first color on the conductive surface; and

repeating the electrophoretically depositing, patterning, and removing steps using mixtures of patternable material and additional color light emitting material to form one or more light emitting elements of one or more additional colors on the conductive surface.

32. The method of claim 26, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

electrophoretically depositing a layer of patternable material on at least the conductive surface;

tackifying one or more regions of the layer of patternable material corresponding to first color light emitting elements;

forming light emitting material of a first color on the tackified regions of the patternable material;

repeatedly tackifying the patternable material and forming light emitting elements to form one or more light emitting elements of one or more additional colors on the conductive surface; and

removing the layer of patternable material resulting in the formation of a plurality of light emitting elements of a plurality of colors on the conductive surface.

5 33. A structure used in the production of a face plate of a display, the structure comprising:

a substrate assembly having a conductive surface at a first side thereof;  
one or more projections extending from the first side of the substrate assembly; and

10 electrophoretically deposited and patternable material on the conductive surface and adjacent the projections.

34. The structure of claim 33, wherein the one or more projections include a plurality of nonconductive spacers extending from the first side of the substrate assembly.

15 35. The structure of claim 33, wherein the one or more projections include a plurality of slightly conductive spacers extending from the first side of the substrate assembly.

20 36. The structure of claim 33, wherein the patternable material defines openings to the conductive surface for use in deposition of one or more light emitting elements on the conductive surface.

37. A structure used in the production of a display, the structure comprising:

25 a substrate assembly including a conductive surface;  
one or more nonconductive regions formed on the conductive surface,  
wherein the one or more nonconductive regions have a thickness less than about 15 microns; and



electrophoretically deposited patternable material formed over the  
conductive surface and the one or more nonconductive regions.

38. The structure of claim 37, wherein the structure further comprises one or  
more projections extending from the substrate assembly beyond the nonconductive  
regions formed on the conductive surface.

39. The structure of claim 37, wherein the one or more nonconductive regions  
include one or more phosphor light emitting elements.

40. The structure of claim 37, wherein the one or more nonconductive regions  
include black matrix material.

41. The structure of claim 37, wherein the patternable material defines openings  
to the conductive surface for use in formation of light emitting elements on the  
conductive surface.

42. A method for use in the production of a display, the method comprising:  
providing a substrate assembly including a conductive surface;  
providing one or more nonconductive regions on the conductive surface,  
wherein the one or more nonconductive regions have a thickness less than about  
15 microns;

electrophoretically depositing a patternable material mixed with a light  
emitting material on the conductive surface and the one or more nonconductive  
regions; and

patterning the patternable material mixed with light emitting material  
resulting in a patterned layer corresponding to one or more light emitting  
elements on the conductive surface.

43. The method of claim 42, wherein the method further includes removal of  
the patternable material of the electrophoretically deposited patternable material  
mixed with the light emitting material to form the one or more light emitting  
elements on the conductive surface.

44. The method of claim 42, wherein the one or more nonconductive regions  
include one or more nonconductive light emitting elements.

45. The method of claim 42, wherein the one or more nonconductive regions  
include a nonconductive light absorptive black matrix.

46. A method for use in the production of a color display to deposit a pattern  
of light emitting elements capable of emitting light of at least two different colors  
when excited, the display including a face plate having a plurality of spacers  
extending from one side thereof for use in spacing the face plate from a base plate  
of the color display, the method comprising:

providing a face plate substrate assembly from which the plurality of spacers extend, a conductive surface of the substrate assembly is exposed in regions between the plurality of spacers; and

using an electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

electrophoretically depositing a patternable layer of a mixture of a patternable material and a first color light emitting material over the conductive surface and adjacent the spacers;

patterning the patternable layer to form regions of the patternable layer corresponding to one or more light emitting elements of a first color;

removing the patternable material from the regions of the patternable layer to form the one or more light emitting elements of the first color on the conductive surface; and

repeating the electrophoretically depositing, patterning, and removing steps using mixtures of patternable material and additional color light emitting material to form one or more light emitting elements of one or more additional colors on the conductive surface.

47. The method of claim 46, wherein the plurality of spacers are nonconductive spacers.

48. The method of claim 46, wherein the patternable material is an electrophoretic photoresist..

49. A method for use in the production of a display, the method comprising: providing a substrate assembly including a conductive surface;

providing one or more nonconductive regions formed on the conductive surface, wherein the one or more nonconductive regions have a thickness less than about 15 microns;

forming a layer of patternable material by electrophoresis over the conductive surface and the one or more nonconductive regions; and

patterning the layer of patternable material by tackifying one or more surface regions of the layer of patternable material for use in formation of light emitting elements on the conductive surface.

50. The method of claim 49, wherein the method further includes applying light emitting material to at least the tackified one or more surface regions of the electrophoretically deposited patternable material and removing the electrophoretically deposited patternable material to form the one or more light emitting elements on the conductive surface.

51. The method of claim 49, wherein the one or more nonconductive regions include one or more nonconductive light emitting elements.

52. The method of claim 49, wherein the one or more nonconductive regions include a nonconductive light absorptive black matrix.

53. A method for use in the production of a color display to deposit a pattern of light emitting elements capable of emitting light of at least two different colors when excited, the display including a face plate having a plurality of spacers extending from one side thereof for use in spacing the face plate from a base plate of the color display, the method comprising:

providing a face plate substrate assembly from which the plurality of spacers extend, a conductive surface of the substrate assembly is exposed in

regions between the plurality of spacers; and

using an electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

electrophoretically depositing a layer of patternable material on at least the conductive surface;

tackifying one or more regions of the layer of patternable material corresponding to first color light emitting elements;

forming light emitting material of a first color on the tackified regions of the patternable material;

repeatedly tackifying the patternable material and forming light emitting elements to form one or more light emitting elements of one or more additional colors on the conductive surface; and

removing the layer of patternable material resulting in the formation of a plurality of light emitting elements of a plurality of colors on the conductive surface.

54. The method of claim 53, wherein the plurality of spacers are nonconductive spacers.

55. The method of claim 53, wherein at least portions of the plurality of spacers are slightly conductive.

56. A method for use in producing a display having a face plate and a base plate, the face plate having one or more spacers extending from one side thereof for spacing the face plate from the base plate in the display, the method comprising:

electrophoretically depositing a patternable material over a conductive surface of the face plate in regions adjacent one or more of the spacers;

patterning the patternable material resulting in a patterned layer defining openings to the conductive surface;

5 forming a light emitting material on the conductive surface through the defined openings; and

removing the patterned layer.

10 57. The method of claim 56, wherein the one or more spacers are nonconductive spacers.

15 58. The method of claim 56, wherein at least portions of the one or more spacers are slightly conductive, and further wherein the electrophoretically depositing a patternable material includes depositing patternable material over the slightly conductive portions of the one or more spacers.

20 59. The method of claim 56, wherein forming the light emitting material on the conductive surface includes forming one or more conductive light emitting elements on the conductive surface through the defined openings.

60. The method of claim 56, wherein forming the light emitting material on the conductive surface includes forming one or more nonconductive light emitting elements on the conductive surface through the defined openings.

25 61. The method of claim 60, wherein patterning the patternable material includes photostabilizing the patterned layer such that the patterned layer is generally insoluble to organic solvents.

62. The method of claim 61, wherein forming the one or more nonconductive elements includes electrophoretically depositing phosphor or phosphor containing material on the conductive surface through the defined openings.

5 63. A method for use in the production of a color display to deposit a pattern of light emitting elements capable of emitting light of at least two different colors when excited, the display including a face plate having a plurality of spacers extending from one side thereof for use in spacing the face plate from a base plate of the color display, the method comprising:

10 providing a face plate substrate assembly from which the plurality of spacers extend, a conductive surface of the substrate assembly is exposed in regions between the plurality of spacers; and

15 using an electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface, wherein using electrophoretically deposited patternable material to form the pattern of light emitting elements on the conductive surface includes:

20 electrophoretically depositing and patterning a layer of patternable material resulting in a patterned layer defining first openings to the conductive surface for use in the formation of one or more first color light emitting elements on the conductive surface;

forming the one or more first color light emitting elements on the conductive surface through the first openings;

removing the patterned layer; and

25 repeating the electrophoretically depositing, patterning, forming and removing steps to form one or more additional light emitting elements of one or more additional colors on the conductive surface.

64. The method of claim 63, wherein the plurality of spacers are

nonconductive spacers.

65. The method of claim 63, wherein at least portions of the plurality of spacers are slightly conductive, and further wherein using electrophoretically deposited patternable material includes depositing patternable material over said slightly conductive portions of the spacers such that electrophoretically deposited light emitting material used to form the pattern of light emitting elements on the conductive surface is not formed on the slightly conductive portions.

66. The method of claim 63, wherein after electrophoretically depositing and patterning the layer of patternable material to define first openings therein to the conductive surface the method includes photostabilizing the patterned layer such that the patterned layer is generally insoluble to organic solvents; and further wherein forming the one or more first color light emitting elements includes forming one or more phosphor elements on the conductive surface by electrophoresis through the defined first openings.